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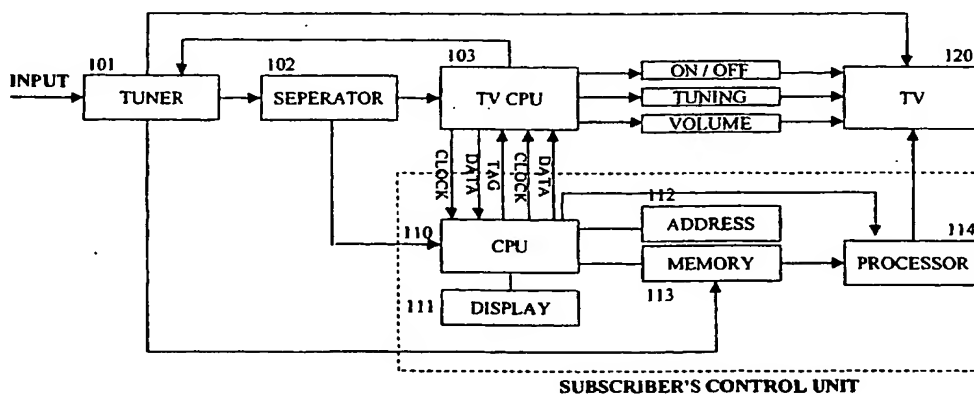
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(54) Title: ADDRESSABLE TELEVISION BROADCASTING SYSTEM



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(57) Abstract: This invention is related to the method of the directional television broadcasting for providing the specified television broadcasting signals to the specified subscribers by using individual address and group address according to the information to be delivered, and the bi-directional communication utilizing the directional television broadcasting signals as the down-stream signals and the host computer of the television broadcasting station as the relay means which transmits the up-stream signals from the subscribers. Also, this invention provides the method for the remote educational broadcasting by classes for the specified paid auditors, the national emergency alert television broadcasting by the specified addressed group target, the e-mail for audio and video and letter by television network, the e-newspaper subscribing system by the broadcasting network, and the new method to control the access system to the parented guide program by S/W rather than V-chip technology to save the cost and better efficiency utilizing the improved address system consisting of individual address and group address, as well as the directional broadcasting method by network TV, satellite TV and cable TV.

Addressable Television Broadcasting System

Field of the Invention

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This invention is a continuation in part of Patent 171650 filed October 5, 1994 and US Patent 6,005,937 filed March 7, 1995 with priority date of March 7, 1994, and related to the method and system of the directional television broadcasting for providing the specific television broadcasting signals to the specified subscribers by
10 their individual addresses and group addresses, and the bi-directional communication technology that utilizes the directional television broadcasting signal as the down-stream signals and the host computer of the television broadcastings station as the relay means which transmits the up-stream signals from the subscribers.

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Also, this invention provides the method and system of the remote educational broadcasting by classes for the specified paid auditors, the national emergency alert television broadcasting to the specified addressed target, the e-mail of audio and video signal, and the e-newspapers subscribing by the television broadcasting network, and the means to control the access to the parental guided program by S/W
20 rather than V-chip technology for better efficiency, utilizing the improved address system consisting of individual and group address as well as directional broadcasting method by network TV, satellite TV and Cable TV.

25 Description of the Related Art

In the previous television broadcasting system, it is used to televise programs to unspecified subscribers, and therefore it needs the technology that could provide specific programs to the specific selected mass. Because the broadcasting station
30 cannot remotely, control the subscriber's TV nor have the means to transmit the specific broadcasting programs to the specific viewer, it becomes impossible for the broadcasting station to alert the viewers who had switched off the television and are asleep when an emergency arises, and do not have the remote control means to switch on the TV set, tune to the channel where such emergency is being broadcast
35 and turn up the volume loud enough to wake up the viewers in bed.

In addition, the broadcasting stations were unable to televise special programs to a specific mass. Group broadcastings, for example, a preaching of a religious sermon to the specific religious group, family broadcasting for the families of the employees of a company, high security broadcasting programs for soldiers or policemen and other like professions, or educational related programs for specific students were impossible to be provided.

Though the network television, satellite and cable television have the superior means to transmit A/V and data signal by it's network, it is still not possible to provide e-mail services using such a benefits due to the lack of the directional communication technology by its network.

Furthermore, a subscriber may request the broadcasting station not to broadcast certain programs that are deemed inappropriate for children's viewing, however the broadcasting stations find it difficult to cater to each and every subscriber individual demands and they do not have the means to intercept specific programs. V-Chip has been invented to prevent children from accessing to such parental guide programs, but this proved unsuccessful since children were able to easily manipulate with the secret coding which parents had encoded. In addition, V-Chips are costly to install into the television receiver, satellite broadcasting set-top boxes, cable TV set-top boxes, thus, it became a necessity to develop a new device that was simple and effective, yet prevent manipulation from children.

One aspect of the present condition of the newspaper industry, is that each press company carries the burden of relying heavily on man-power to deliver the printed newspaper to the readers. Another existing problem is the increasing labor costs, thus increasing the costs of subscribing a newspaper as well as the difficulty of hiring employees to do such physical labor. Yet another problem is the delivery of newspapers on timely basis to subscribers residing at remote areas or abroad.

To overcome the limitations in the prior art described above; the press company had developed a system to provide news through the Internet. But readers could access to the news only through the PC monitor, and would be unable to scan through the newspaper as they read the printed original journal.

To assume network, satellite or cable TV broadcasting stations using directional broadcasting television techniques, the newspaper may be compressed to digital data, where it can be transmitted and stored to subscriber's terminal of the designated subscribers, then there is a need to develop a subscription service where one may
5 subscribe electronically to a variety of newspapers through the television monitor, and pay the arranged subscription fees. It would then be possible to view newspaper from the television monitor from a variety of subscribed newspaper, and important and/or necessary article may be printed out or stored as digital data, thus saving the cost of printing and discarding. In addition, receiving the latest news
10 from a specified newspaper in real time from remote district or furthest country will be possible at the lowest rate.

Moreover, in terms of educational broadcasting, previous program broadcasting by network, satellite or cable broadcastings were free of charge to unspecified mass,
15 and using these media, allow students from all over the nation to attend a lecture from a variety of class subjects with a fee charge have yet to be devised.

During the present digital broadcasting period, network, satellite or cable TV programs are able to broadcast over 200 different channels. There is a need for
20 remote educational methods comprising classes from students nationwide, and the grades of each individual are evaluated accordingly, where the grades are acknowledgeable and therefore brings forth the importance and growth the operation of cyber education as well as development of broadcasting educational techniques.

25 In cable broadcasting or satellite broadcasting, the broadcasting stations transmit its program after scrambling and descrambling at the set-top box (converter) however this costly devise is not compatible with all these various standards of foreign region; thus difficulty arises in an attempt to manage cable broadcast station nationwide.

30 For home television sets using network, satellite and cable TV broadcastings, in terms of cable television broadcast which has individual bi-directional communication means, if there is a signal invasion and/or interference from outside to the data communication line between the cable station's host computer and a
35 subscriber set-top unit during normal bi-directional cable TV operations, the data

communication becomes paralyzed because data cannot be transmitted or received.

Specifically, if there is continuous reciprocal interference and cable station cannot find the signal invasion point, then cable station must collect the set-top unit from every subscriber and physically change the existing communication frequency from the unit to an un-interfered new frequency. Existing devices do not provide a solution to the signal interference or signal ingress problem during two-way communication between the station and the subscriber's set-top box. Furthermore, due to technical circumstances, broadcast stations have always used telephone lines for upstream communication. However, because of the telephone modem disadvantages, it has never been possible for a perfect two-way communication.

Though high-speed cable modem has been developed to connect to the Internet, there is a limit for reducing noise from using one fixed transmitting frequency and one fixed reception frequency. Therefore, this system is still on the basic stage using approximately 400 subscribers per cell and has the limitations of frequency interfering with nation wide broadband and the high cost of the modem proves to be the inevitable problem.

In addition, since the existing communication methods between the station and the subscriber rely on the cable, and the communication frequencies are fixed. Moreover, since each station uses different frequencies, there is no compatibility among the set-top boxes. In addition, the repair cost is high and the lifetime of the set-top box is short because the existing set-top boxes are made as single-bodied unit rather than combined modules.

Furthermore, current set-top boxes do not provide international compatibility. For example, video standards differ from country to country, region to region, as does the bilingual and stereo system, the electrical voltage, current cycle and the frequency apportionment for cable TV. It is no wonder that in this situation there isn't a decoder that is compatible with all these various standards around the world. Further, there is no compatibility among parts.

For cable TV broadcasting network operation, the traditional bi-directional data communication system involves a station's host computer calling a subscriber set-top

unit using a successive call method. For the subscriber set-top unit to report the data to the host computer, the successive call method tools about 30 minutes per 100,000 subscribers. Therefore, the successive call method prohibits performing and instant viewer rating survey, or assist in question arising during an examination
5 at an educational broadcast.

Summary of the Invention

10 As an information delivering media, this devise has been invented to provide the method and technology for directional broadcasting by its address and related bi-directional communication utilizing the network TV, cable TV or satellite TV broadcasting signal. It comprises broadcasting programs and data, such as video, audio or letter as the down-stream signal to the specified receiver by relaying the
15 station's host computer. Considering the technical circumstances that broadcasting system is changing from analog to digital, and the data compression technologies are rapidly developing and the number of the broadcasting channels are increasing, there is a need to develop ways to deliver information data and the value added communication services utilizing television network.

20 To satisfy the above technical requirements, network TV, satellite TV, cable or wireless cable TV transmitting stations are broadcasting programs to the specified subscribers, inserting information data and instruction data signals comprising address data and control data of the receiving group. This enables the broadcasting
25 stations to broadcast directionally the specific data to the specific receivers, and where subscribers are able to receive the information data signal and the instruction data signal by the apparatus of receiving the above signals and controlling TV receivers as of the instruction signal of the TV program. This provides the technology to control subscribers' TV remotely such as tuning TV channels, On/Off
30 and volume control by the broadcasting station's host computer during emergency while subscribers are watching other channels. To ensure efficient control of parental guide programs, the addressable broadcasting means for the specified receiver's group, the remote educational broadcasting means by class for specified group by group basis, the e-mail A/V system utilizing TV broadcasting and the e-
35 newspaper subscription system utilizing TV network.

Brief Description of the Drawings

Referring now to the drawings in which like reference number represent corresponding parts throughout.

5 Fig 1 is a block diagram that illustrates the subscriber's controlling unit for the network TV operation of this invention.

Fig 2 is a block diagram that illustrates the subscriber's controlling unit for the satellite TV operating this invention.

10 Fig 3 is a block diagram that illustrates the subscriber's controlling unit for cable TV operation of this invention.

Fig 4 is a block diagram of the unit purpose digital cable TV set-top box.

Fig 5 is a block diagram of an e-newspaper-subscribing device of this invention.

Fig 6 is a block diagram of a bi-directional communication system for cable TV network operation of this invention.

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Detailed Description of the Invention

20 Overcoming the limitations faced from the previous technology, and based on the full comprehension and expectation of the current situations and to clarify the possible barriers faced in the future, the present invention provides technologies, methods and manufacturing techniques of related apparatus enabling to transmit information data with subscriber's address, by inserting the television programs of network TV, satellite TV or cable TV broadcasting.

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In the following description of the preferred embodiment, reference is made to the accompanying drawings, which form a part hereof, and in which way is shown by way of illustration the specific embodiment in which the invention may be practiced. It is to be understood that other embodiments may be utilized a structural changes
30 may be made without departing from the scope of the present invention.

It is therefore an object of the present invention to provide that method of directional communication for conveying the specified broadcasting programs, video images, still pictures, audio and letters to the specified subscribers through the way of
35 network TV, satellite TV or cable TV broadcasting, and the related apparatus for the

remote education by class, the national alert broadcasting to designated group by designated area, the control means of parental guide program, e-mail system by TV receiver and e-newspaper system. With referring the attached illustration, the configuration of the preferred embodiment, the operation and the functions are as follows:

Fig 2 illustrates the block diagram of the subscriber's control unit for this invention, utilizing network TV broadcasting system. According to the illustration, the invention comprising the tuner (101) acts as the receiver of transmitted control data signal, which is inserted into programs that are broadcast from the broadcasting station; signal separator (102) which separates the data signal from the broadcasting programs a central processing unit, CPU (110) for controlling the CPU (103) of TV set; address designator (112) for designating at least one or more address comprising group addresses and individual address of the subscriber's CPU (110); memory device (113) which stores the transmitted data from the broadcasting station to the address designated specified subscriber; display means (111) that indicates arrival of the specified transmitted information from the broadcasting station; signal processing means (114) that converts the data stored in the memory means to receivable signals to TV by control of the CPU of the subscriber's control unit.

Between the TV's CPU (103) and subscriber's CPU (110), appointing a standard protocol for the reciprocal control of the data and operating with a connection means of the subscriber's control unit so it may be able to be constituted separately. Further, a supplement of real time clock means to the subscriber's controlling means, and setting a term of validity for the directional broadcasting service where subscription fees collecting device is used for charged programs.

Thus, with subscriber's CPU (110) to control the TV's CPU (103), descrambling means of TV broadcasting programs or security means can also be served by a subscriber's controlling unit.

The description of directional broadcasting functions based on directional TV broadcasting system is as follows.

First, the host computer of the broadcasting station classifies subscribers into groups to be controlled or not to be controlled, and designates group addresses to subscribers with in-band signals of the broadcasting program of the station. The

broadcasting station transmits information in data and inserted them in the form of TV broadcasting signal to subscribers by their addresses. The subscriber's CPU (110) receives information data and instruction data which is designated to specified subscriber by address (individual and group addresses) and controls the tuning of channel. On/Off switch, volume control or stores the specified data in memory means (113) according to the instruction data.

In case of broadcasting of national emergency, programs may be limited to subscribers by region or profession, endowing common group addresses to reduce the amount of address data and making possible the immediate contemporary calls. The subscriber's CPU (110) controls the CPU (103) of TV set by the instruction signals separated by separate means (102) and the CPU (103) controls the tuning of the TV channels, On/Off and volume of the subscriber's TV even if the specified subscriber's TV is off or receiving other channels.

According to this concept, the broadcasting station may broadcast educational programs in identical ways as providing group address and instruction data on the educational program of the specified class or subject. Subscriber's TV will be automatically turned on to a specified channel, where the registered class is being broadcast at specific time, allowing registrants to form study groups to join others who participate the same class and/or subject.

First of all, to control the subscriber's TV set, satellite set-top boxes or cable TV set-top box, a step is required to make subscriber's control unit which is comprised of a separating means (102) used to separate data signals from broadcasting signals, a CPU (110) coupled to the separating means to control TV channels, or On/Off and the volume of TV sets, and address designating means (112) coupled to the central processing means for designating at least two or more addresses consisting of individual address and group address; and finally a step is necessary to make a connecting protocol between the subscriber's CPU (110) and the CPU (103, 206, 306) of TV set or satellite set-top boxes or cable TV set-top boxes which support universal connecting means.

After the mentioned steps taken, the host computer of the broadcasting station designates a common group address by class or by subject, by calling the class registrants by individual address through in-band of the broadcasting signals, and

broadcasting the educational programs with a common group address data signals and instruction data signal according to their class or subject. This is necessary so that the subscriber's control unit receives the instruction data signal by the common groups address, and control TV set or satellite set-top box or cable TV set-top box for tuning channels, On/Off and volume for subscribers to receive educational programs on time.

This system also provides the method of evaluating individual's follow-ups and their attendance of lectures of the class or subject by giving questions for examination through broadcasting for grading examination and receiving answers from attendants in wire or wireless communication means to the host computer of the educational programs.

For specified religious groups, members of the military or the police force that require high security, a political party that intends on giving special educational programs to its members, or other class specified programs, the invention allows the broadcasting of special programs to the designated address of its private members only as of the said educational system.

When the memory means (113) is supplemented into the subscriber's CPU (110), e-mail services where each address of the specific message data is being transmitted by audio, video or letter data and stored in the memory means (113) via the broadcasting station's host computer, and subscriber's receives at the TV screen by the notice of the displaying means (111) that reports of the e-mail reception.

Messages that each subscriber may send to the host computer broadcasting stations, in case of public and satellite TV broadcasting, may transmit the address data of the recipient to the host computer using it's telephone communication modem with e-mail data to be transmitted, the broadcasting station that transmits addresses designated broadcasting signals, and in case of cable TV broadcasting the host computer itself as a relaying means constitutes of a system that acts as a bi-directional communication means by its own network.

In addition, with the possibility of the addressed broadcasting mentioned above, when the broadcasting station broadcasts programs that are prohibited to children, when the subscriber requests such programs not to be run on their personal TV sets,

the broadcasting station may then insert the necessary data needed to prohibit the broadcasting of such programs, and designates a group address code to the subscriber's control unit to control subscriber's TV and skipping the prohibited programs that are being televised.

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At this time, if the subscriber transmits the data to prohibit the broadcasting of a specified rated program to the host computer of the broadcasting station, the host computer will adjust the common group address of similar rate, endowing the necessary group address to control the unit of the subscriber, which allows the control of common address as subscribers may request to the host computer of the broadcasting station the prohibition of a specified class programs, this provides the improved system on the former V-chip.

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With the addressable TV broadcasting system of this invention for either network, satellite or cable TV broadcasting network operation, it may be possible the e-newspaper delivery system as of Fig 5, which comprises of input means (511) for receiving digital data of newspaper from a host computer where the newspaper is transmitted in the form on digital data. The broadcasting station compresses and inserts the data signal of the newspaper from the host computer, the separating means (512) where it separates the newspaper data signals that is received from the input means; the first memory means (503) where is stores the data signal of the newspaper that was separated from the separator means; data processing means (507) where it converts and processes the signals from the first memory means, that are exposable to the TV monitor; searching means (508) that searches, enlarges or erase the specified newspaper data signal from the TV monitor; the CPU (506) that controls all of the mentioned controls; address designator means (502) for designating individual and group addresses from the CPU, printing means (509) that prints out specific articles of the newspaper; and second memory means that stores the specified articles which the subscriber had selected for storage.

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Transmitting digital data of the newspaper using network, satellite or cable TV broadcasting network is done by that the newspaper company sends the digital data to the host computer of the broadcasting station, the host computer of the broadcasting station inserting and transmitting the received data to the subscriber's terminal which, receiving and storing the transmitted newspaper data into the

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memory means, displaying the received newspaper data from the memory storage on the TV, where it enables the subscriber to enlarge and read the newspaper, and if necessary, storing and/or printing of a specific article that the subscriber had just read. From the subscription on a newspaper mentioned above, when the newspaper
5 company inserts the compressed signal of the newspaper data to the broadcasting signals of the data channel, simplifying the code addresses of the subscribers addresses according to the newspaper or groups, the broadcasting stations host computer pages the individual addresses of the subscriber's electronic newspaper subscription unit and endowing group code addresses and inserting addresses by
10 newspaper and by group together with the newspaper data from the broadcasting station for transmitting such data to the subscribers newspaper devise so that the specified and/or coded newspaper may reach the subscribers according to their subscriptions.

15 From the above addressable broadcasting technology, using network, satellite or cable TV broadcasting network to broadcast educational programs, parental guide programs and e-mails and electronic newspapers are possible, but satellite and cable TV set-top box by broadcasting ways and means, OSD language, multi lingual system, or data frequency are different from country to country, region to region.

20 Fig 2 illustrates the set-top boxes for the addressable satellite TV broadcasting system which comprises of input means (201) for receiving the broadcasting signal, a separating means (209) for separating information data signal and instructions data signal, CPU (210) for controlling the tuning of channel, On/Off or volume control
25 according to the instruction data from the host computer, an address designating means (212) for designating at least two or more of the address consisting of individual and group addresses, memory means(213) for storing data which CPU designated, a signal processing means (214) for processing signals stored in the memory means for TV and a display means (211) for displaying the signal when the
30 message data stored in the memory means

When separating the subscriber's control unit from the set-top box by the form of attachable module or card, the subscriber's control unit comprises a signal receiving means by separator (209) for receiving the data signal which is separated from the
35 input means, a CPU (210) for controlling CPU (206) of the set-top box by the

instruction signal from the host computer for de-scrambling security for accessing to the system, tuning of channels and On/Off or volume control of the TV set, an address designating means (212) for designating at least one or more address for individual and group, and a standard protocol to connect between CPU (206) of set-top box and CPU (210) of subscriber's control unit.

When universalizing the set-top box with the attachable subscriber's control unit, the set-top box is classified into a fixed function and variable function. The fixed function is a singular-bodied unit assembled on a PCB (200), while variable functions are separable and modularized based on their functions according to country to country, and region to region, such as tuner (210), bilingual module (203), OSD module (205) by the television broadcasting standards such as NTSC, PAL and SECOM. By the making standard protocol between CPU (206) of the main-board and CPU (CPU 1 - CPU 5) of each module, it provides the universal capability of replacing module according to national standard of each country, and up-grading capability by up-grading the functions of each modules.

Consistent with the above concept, Fig 3 illustrates a block diagram of directional set-top box for cable television network. The cable television set-top box also needs universalization due to the differences of standards of each country.

The universalization of set-top box is also possible by making the set-top box into two groups, one as the fixed singularly mother board PCB (300) and variable functions in separated attachable modules such as tuner (301), MOD and DEMOD module (303), OSD module (304), descrambling and security module (305) according to television system such as NTSC, PAL and SECOM and standard of each country, by making standard data communication protocol between CPU (306) of the main board and CPU (CPU 1 - CPU 5) of each module, and by making the receiver and transmitter (320, 323) with variable frequency system between the host computer of the station and set-top box by changing the frequencies according to the instruction signal from the host computer through in-band or out of band communication. It provides universal capability by replacing modules and changing frequency according to the standard of each country, and up-grade capability by up-grading each module or main board, and also this set-top box manufacturing technology is applicable to set-top box using the data communication

method by wireless, electric wire or telephone network. At this moment, set-top box enables analog TV to also be receptive if the signal conversion (309) attached to be connected both analog TV (340) and digital TV.

- 5 In Fig 4 illustrates the supplemented ways of the set-top box that has the multiple functions to connect digital and analog TV, connectable to the Internet as well as the various multi media. Regarding Fig 4, as a means of transmitting and receiving of set-top box, when supplementing the detachable module with the Internet connectable means, it would enable the addressable set-top box to connect to the
10 Internet as well.

- Further, by adding the detachable communication module (400) for changing the data communication frequency and the means for connecting Internet with PC, it is done without any extra modem cable. In addition, this system enables to connect various
15 multimedia equipment such as DVD, CD, and VCR by multi media connecting means (432 - 435) and with the signal from the multi media by the A/V Switching means of the addressable set-top box.

- When separating the subscriber's control unit from the set-top box in the form of
20 attachable module or card, the subscriber's control CPU unit comprises of a signal receiving means CPU (310) used to control CPU (306) of the set-top box, used for controlling the broadcasting of specific programs that are either viewable or not, the power switch, the tuning of channels and the volume control of the TV set.

- 25 An address designating means (312) for designating at least two or more addresses consisting of individual address and group address and the standard data communication protocol between the subscriber's CPU (310) and the CPU (306) of the set-top box with the connecting means to connect signals of Data, Clock and Tag.

- 30 Furthermore, this system will be added to the memory means (313) to store data for e-mail or e-newspaper, and a signal processing means (314) for processing signals stored in the memory means for the TV sets, and display means (311) for indicating the status of the memory means.

- 35 Some other advantages of this invention are providing the method for bi-directional

communication for internet operation, e-commerce activities, e-mail operation and educational system by utilizing the directional television broadcasting signal as the down-stream signal and wire or wireless telephone network for the up-stream signal.

- 5 However, the bi-directional data communication between the host computer of cable TV station and subscriber's set-top box in this invention is the multi-channel loop communication method by variable frequency.

Fig 6 illustrates a block diagram of the multi-channel loop communication system of
10 this invention with variable frequency. This system is comprised of the transmitter (616, 602) which has PLL circuit for the variable operation of frequency between the host computer of the broadcasting station and set-top boxes of the cable TV network receiver (605, 612) which having PLL circuit for variable frequency, memory means (604, 614) which are used to store a plurality of frequencies for variable operation,
15 and in-band means (620) which the host computer transmits the instruction data signal with broadcasting signal.

The method to make bi-directional data communication system between the host computer and a plurality of subscriber's set-top box is comprised of the steps to store
20 at least two or more frequencies in the memory means (604, 614) to use for communicate between the host computer and a plurality of set-top box, transmitting the instruction signal from the host computer (601) to subscriber's set-top box by in-band of the broadcasting signal, separating the instruction signal from the broadcasting signal at set-top box, changing frequency of the transmitter or receiver
25 as of the instruction signal from the host computer by PLL (603, 613, 607, 616), and making a new communication channel utilizing new frequency which is changed by the instruction signal from the host computer (601). By this system, when the signal ingress or noise are detected on a new communication channel, the host computer detects by the steps of transmitting the calling signals to a plurality of set-
30 top box in high speed, calculating the return signals from the set-top box and detecting the noise or signal ingress by the calculation of return signal, transmitting an instruction signal to the subscriber's set-top box to change the frequency of the memory means when the designated number of return signals are not received with the new frequency.

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If the noises or signal ingress are found again in the new communication channel, the host computer transmits an instruction signal again to change the frequency to the third frequency of the memory means till the N number of frequencies and returns again the first frequency among the frequency loop of the memory means. By this method, the bi-directional communication channel between the host computer and a plurality of set-top box remains cleans and noise free, thus allowing a smooth operation of PC for internet through cable TV network.

From the prior mentioned method, a host computer can communicate with a plurality of set-top box of the cable network by dividing the specified number of set-top box in a group-cell, designates the common frequency for each group-cell and make a communication network by which a host computer controls all of the set-top box by the group cell unit bases.

This method is applicable to various types of cable TV system that utilizes wireless, power lines and/or telephone lines. In addition, by adding the memory means (330) to the CPU (306) of the set-top box, the subscriber may store the data to be transmitted to the host computer, when the host computer gradually calls the memory means (330) to transmit the data signals that was stored, and that data is automatically deleted.

The foregoing description of the preferred embodiment of the invention has been presented for the purpose of illustration and description. Modifications and variations are possible in light of the above technology.

What is claimed is:

- 1: An apparatus for receiving the address designated television program signal through the TV network for remote control of TV set by the station comprising:
- 5 (1) Input means for receiving the broadcasting signal which containing data signal with address from the host computer of the broadcasting facility;
- (2) Separating means, coupled to the input means, for separating information data signal and instruction data signal from the broadcasting signal received;
- 10 (3) Central processing unit, coupled to the separating means, for controlling CPU of TV set by the instruction signal from the host computer for.
- (i) Controlling tuning of channel to permit viewing or skip the channel of the addressed television broadcasting program.
- (ii) Controlling on/off function of TV set; or.
- (iii) Controlling up/down of volume of TV set; and.
- 15 (4) Address designating means, coupled to the central processing unit, for designating at least one or more of individual address and group address.
- 2: An apparatus of claim1, further comprising,
- (1) Memory means, coupled to the central processing unit, for storing signal which
- 20 received by address from the host computer;
- (2) Signal processing means, coupled to the memory means, for processing signal from the memory means to the operable signal by TV set; and
- (3) Display means, coupled to the memory means, for indicating the receiving of message signal in the memory means.
- 25
- 3: A satellite TV set-top box having universal capability comprising,
- (1) A plurality of functional modules which separated from the fixed main board by the function and the standard of each region, having CPU to control the function of module and interface with CPU of the main board;
- 30 (2) Main board consisting of the fixed functions of the set-top box and CPU for controlling CPU of each module; and
- (3) Connecting means having a standard protocol to communicate between CPU of the main board and a plurality of CPU of the functional modules.

4: A set-top box of claim3, having a subscriber's control unit attachable to the set-top box which comprising,

- 5 (1) Input means for receiving data signal which separated from receiving data signal which separated from broadcasting signal which containing broadcasting program signal and data signal from the host computer of the broadcasting facility;
- (2) Central processing unit, coupled to the input means, for controlling CPU of the main board of set-top box by the instruction data signal from the host computer for,
- 10 (i) Controlling tuning of channel to permit viewing or skip the channel of the addressed broadcasting program;
- (ii) Controlling on/off function of TV set; and
- (iii) Controlling up/down of volume of TV set.
- (3) Connecting means, coupled to the central processing unit, having a standard protocol to communicate between the central processing unit and CPU of set-top box.
- 15 (4) Address designating means, coupled to the central processing unit, for designating at least one or more of individual address and group address.

20 5: A set-top box of claim3 or claim4, further comprising,

- (1) Memory means, coupled to the central processing unit, for storing signal received by address;
- (2) Signal processing means, coupled to the memory means, for processing signal stored in the memory means to the operable signal by TV set; and
- 25 (3) Display means, coupled to the memory means, for indicating the receiving of message signal in the memory means.

6: A subscriber's control unit for controlling set-top box for receiving satellite broadcasting comprising,

- 30 (1) Input means for receiving data signal separated from broadcasting signal;
- (2) Central processing unit, coupled to the input means, for controlling CPU of set-top box according to the instruction signal for controlling tuning of channel to permit viewing or skip the channel of the addressed broadcasting program, power on/off and volume up/down of TV set;
- 35 (3) Address designating means, coupled to the central processing unit, for

designating at least one or more of individual address and group address.

- (4) Connecting means, coupled to the central processing unit, having a standard protocol to communicate between the central processing unit and CPU of set-top box;
- 5 (5) Memory means, coupled to the central processing unit, for storing signal received by address;
- (6) Signal processing means, coupled to the memory means, for processing signal from the memory means to viewable signal for TV set;
- (7) Display means, coupled to the memory means, for indicating the receiving of
10 message signal in the memory means.

7: An addressable set-top box for cable television network having interoperable function, which comprising.

- (1) A plurality of functional modules which replaceable and separated from the fixed
15 function of the main board of set-top box according to the function and the standard of each region, and having CPU to control the function of module and operation of the main board;
- (2) Main board consisting of CPU and the fixed functions of the set-top box for controlling CPU of the functional modules;
- 20 (3) Connecting means, coupled to the main board, having a standard protocol to communicate between CPU of the main board and a plurality of CPU of the functional module;
- (4) Separating means for separating data signal from the broadcasting signal received;
- 25 (5) Data communication means having the capability to change frequency between set-top box and the host computer according to the instruction signal from the host computer;
- (6) Subscriber's control unit, coupled to the main board and attachable to the set-top box, for controlling the main board, having an address designating means for
30 designating at least one or more of individual address and group address and security control means to access set-top box.

8: An addressable set-top box of claim7, wherein the subscriber's control unit is modular card and separately attachable to the set-top box.

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- 9: An addressable set-top box of claim7 or claim8, further comprising a signal processing means for converting digital signal to analogue to make the connecting of digital TV set and analogue TV set possible for viewing.
- 5 10: An addressable set-top box of claim7 or claim8, wherein the communication means having multi channel frequency variable function and Internet connection capability.
- 10 11: An addressable set-top box of claim7 or claim8, wherein the communication means has function to change the frequency of transmitter or receiver by the instruction signal separated from broadcasting signal.
- 15 12: An addressable set-top box of claim10 of claim11, further comprising that down-stream signal is the data signal separated from the broadcasting signal and up-stream signal is the out of band signal of the communication means, for internet connection.
- 20 13: An addressable set-top box of claim7 of claim8, wherein the subscriber's control unit comprising memory means for storing data signal separated from the broadcasting signal, display means for indicating the receiving signal of the memory means, and signal processing means for processing signal from the memory means to the operable signal by TV set.
- 25 14: An addressable set-top box of claim7 or claim8, further comprising memory means, coupled to the CPU of the main board, which stores data that will be transmitted to host computer of the station and automatically erases the data once they are transmitted.
- 30 15: An addressable set-top box of claim7 of claim8, wherein the communication means having PLL circuit for changing frequency by the instruction signal from the host computer.
- 35 16: An addressable set-top box of claim7 of claim8, wherein the communication means having two-way communication capability comprising down-stream signal by in-band signal from the broadcasting station and up-stream signal by the variable frequency of out of band.

17: An addressable set-top box of claim7 or claim8, further comprising switching means for the connection of a plurality of multi-media equipment's for switching A/V signal for TV set.

5 18: The method for remote controlling subscriber's TV set utilizing network TV, satellite TV or cable TV system, comprising the step of,

(1) Transmitting the broadcasting signal with information data signal, instruction data signal and address data signal from the broadcasting station;

(2) Adding subscriber's control unit on TV set or set-top box, which comprising

10 (i) Input means for receiving data signal from the broadcasting signal;

(ii) Central process unit for controlling TV set or set-top box according to the instruction signal by input means; and,

(iii) Address designating means for designating at least one or more of individual address or group address for receiving the address designated broadcasting signal

15 from the broadcasting station.

(3) Receiving the address designated television broadcasting signal with the subscriber's control unit and controlling TV set or set-top box by tuning of channel, power on/off or volume up/down according to the instruction signal separated from the broadcasting signal.

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19: The method of claim18, wherein the subscriber's control unit having a connection means with the standard protocol to communicate between the central process unit of subscriber's control unit and CPU of set-top box or TV set, and make the subscriber's control unit separately attachable to set-top box or TV set.

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20: The method Claim19, wherein the subscriber's control unit further comprising a real time clock for checking the valid time of the paid broadcasting service to collect the fee.

30 21: The method claim19, wherein the subscriber's control unit further comprising security means for controlling security access or descrambler means.

22: The method of claim18 or claim19, wherein the subscriber's control unit further comprising wire or wireless up-stream communication system to the host computer
35 of the broadcasting station for making two-way communication network utilizing the

host computer of the broadcasting station for relay.

23: The method of claim22, wherein down stream signal comprises the data
broadcasting signal with individual address or group address from the broadcasting
5 station.

24: The method for designating group address remotely comprising the step of.

- (1) Supplying the subscriber's control unit after designating individual address of the subscriber;
- 10 (2) Designating the group address by calling individual address through the instruction signal from the host computer to control by group;
- (3) Transmitting the broadcasting signal with group address for controlling by group bases.

15 25: The method of educational broadcasting utilizing network TV or satellite TV or cable TV system, comprising the step of,

- (1) Adding subscriber's control unit on TV set or set-top box, which comprising
 - (i) Input means for receiving data signal from the broadcasting signal,
 - (ii) Central process unit for controlling CPU of TV set or set-top box according
20 to the instruction signal by input means,
 - (iii) Address designating means for designating at least one or more of individual address or group address for receiving the address designated broadcasting signal from the broadcasting station.
- (2) Adding connection means having a standard protocol to interface between CPU
25 of the subscriber's control unit and CPU of the set-top box or TV set;
- (3) Transmitting the educational program by the form of broadcasting signal with instruction signal and group address signal by the broadcasting station;
- (4) Receiving the educational program by group address and controlling tuning of channel, power on/off, and volume up/down by the instruction signal from the
30 broadcasting signal by subscriber's control unit.

26: The method of claim25, further comprising the step of,

- (1) Transmitting the questions for examination with the educational program by group address by the host computer;
- 35 (2) Transmitting answer through wire or wireless communication device with their

own ID code to the host computer of the broadcasting facility which broadcasts the educational program by the subscribers:

- (3) Recognizing the subscriber whom transmitted the answer, as attendance of the class of the educational program and calculating the result of the test for notice
5 by the host computer.

27: The method of claim25 or claim26, wherein transmitting the educational program by the communication means of cable television network, which comprising transmitter and receiver, frequency changing means by PLL circuit, separating means
10 for separating data signal from the broadcasting signal, and CPU for controlling the frequency changing means, and receiving answer of the test through cable television network.

28: The method of claim25 or claim26, further comprising the step of,
15 (1) Designating a single group address to all of the registered attendant of the class;
(2) Transmitting the educational program with a single group address.

29: The method of emergency alert broadcasting utilizing network TV or satellite TV or cable TV system, comprising the step of,
20 (1) Adding subscriber's control unit on TV set or set-top box, which comprising
(i) Input means for receiving data signal from the broadcasting signal,
(ii) Central process unit for controlling CPU of TV set or set-top box according to the instruction signal by input means,
(iii) Address designating means for designating at least one or more of individual
25 address or group address for receiving the address designated broadcasting signal from the broadcasting station.
(2) Adding connection means having a standard protocol to communicate between CPU of the subscriber's control unit and CPU of the set-top box or TV set;
(3) Transmitting the emergency alert program signal by the form of the broadcasting
30 signal from the broadcasting station;
(4) Receiving the emergency alert program by group address and controlling tuning of channel, power on/off, and volume up/down by the instruction signal from the broadcasting signal by the subscriber's control unit.

35 30: The method of parental guided program broadcasting utilizing network TV or

satellite TV or cable TV system, comprising the step of,

- (1) Adding subscriber's control unit on TV set or set-top box, which comprising
 - (i) Input means for receiving data signal from the broadcasting signal.
 - (ii) Central process unit for controlling CPU of TV set or set-top box according to the instruction signal by input means,
 - (iii) Address designating means for designating at least one or more of individual address or group address for receiving the address designated broadcasting signal from the broadcasting station.
- (2) Adding connection means having a standard protocol to communicate between CPU of the subscriber's control unit and CPU of the set-top box or TV set;
- (3) Designating group address according to the grade of program which subscriber's requested not to be viewed at the designated TV set by the host computer;
- (4) Transmitting the parental guided program with instruction signal and group address signal by the rate of program by the broadcasting station;
- (5) Receiving the parental guided program with group address signal and instruction signal and controlling tuning of the channel by the group address of the rate to skip so that not to be viewed by the subscriber's control unit.

31: The method of e-mail utilizing network TV, satellite TV or cable TV system comprising the steps of;

- (1) Adding subscriber's control unit on TV set or set-top box, which comprises of,
 - 1) input means for receiving data signal from the broadcasting signal,
 - 2) Memory means for storing the message data signal delivered from the input means,
 - 3) Display means for indicating the reception of messages in the memory means,
 - 4) Processing means for processing the message signal to be viewed on TV sets,
 - 5) Address designating means for designating at least one or more individual addresses or group addresses for receiving the address designated broadcasting signals from the broadcasting station,
 - 6) CPU for controlling the above means and communicating with CPU of the TV set to read the message with TV set by subscriber.
- (2) Adding connection means by having a standardized protocol to communicate between CPU of the subscriber's control unit and the set-top box CPU of the TV

set;

- 5 (3) Transmitting e-mail messages from subscriber's control unit by wire or wireless communication devise to the host computer where e-mail messages are converted to the broadcasting signal with instruction signal and address signal, and re-transmitting them to the subscriber's control unit according to their addresses;
- (4) Receiving e-mail messages according to their addresses and storing in the memory means by the subscriber's control unit of the receiver;
- 10 (5) Reading the message with the TV set by operating the subscriber's control unit of the receiver.

32: The method of claim 31, further comprising the step of,

- (1) Designating group addresses for e-mail by the host computer of the broadcasting station;
- 15 (2) Transmitting the e-mail messages after converting to the broadcasting signal with group addresses;
- (3) Receiving the entire group subscriber's at the same time through e-mail messaging.

20 33: The method of bi-directional communication for cable TV network with variable frequency, comprising the steps of,

- (1) Transmitting the broadcasting signal with addressable instruction signal from the host computer;
- (2) Separating the instruction signal from the broadcasting signal at set-top boxes;
- 25 (3) Setting-up the frequency of transmitter or receiver by the instruction signal of the host computer with PLL circuit;
- (5) Establishing the new communication network with the new frequency changed by the instruction signal from the host computer;

30 34: The method of claim33, further comprising

- (1) Separating the subscriber's control unit from set-top box, which comprising
- (i) Input means for receiving data signal from the broadcasting signal,
- (ii) CPU for changing frequency of transmitter or receiver by the instruction signal from the input means,
- 35 (iii) Address designating means for designating address of the subscriber's

control unit.

- (2) Controlling the function of the set-top box by making a standard protocol for interface between CPU of the subscriber's control unit and CPU of the set-top box;
- 5 (3) Changing frequency of transmitter or receiver of the set-top box by the instruction signal from input means.

35: The communication method utilizing cable TV network comprising the step of.

- 10 (1) Storing at least two or more frequencies for transmitter and receiver in the memory means of transmitter and receiver of the set-top box;
- (2) Transmitting the call signals continuously to the receiver of every set-top box from the host computer;
- (3) Detecting communication barrier by the calculation of the return signal arriving by the host computer;
- 15 (4) Changing to the next frequency stored in the memory means, when the arriving of the return signal is less than prearranged calculation, by the instruction signal of in-band from the host computer which superimposed on the broadcasting signal;
- 20 (5) Changing frequency again when the communication barrier happened, again and continuously changing frequency among the frequency loop consisting of the number of frequency stored in the memory means, and keeping the noise free communication channel between the host computer and a plurality of set-top box.

36: The two-way communication system between the host computer and a plurality of subscriber's terminal comprising,

- 25 (1) Host computer comprising transmitting means and receiving means for communicating between the host computer and a plurality of terminal, memory means for storing N number of frequency to transmit and receive, PLL means for changing frequency, and noise detecting means for detecting noise or signal ingress on the line;
- 30 (2) A plurality of terminal comprising transmitting means and receiving means for communicating with the host computer, memory means for storing N number of frequency to change, PLL means to change transmitting frequency and receiving frequency, CPU for controlling the above means, and address designating means
- 35 for designating address of CPU;

- (3) Changing the frequency by the instruction signal from the host computer up to N number frequency and return to 1st frequency within the frequency loop stored, wherever the host computer detects noise or barrier with noise detecting means.

5 **37:** The system of claim36, further comprising,

- (1) Configuring N number of group-cell with certain number of the subscriber's terminal;
(2) Designating a common frequency at each group-cell and storing the common frequency in the memory means of each terminal;
10 (3) Communicating with common frequency between the host computer and each group-cell and changing frequency by group-cell bases when the host computer detects noise.

15 **38:** An apparatus receiving e-newspaper utilizing network TV, or satellite TV or cable TV system comprising,

- (1) Input means for receiving the compressed digital data signal of newspaper which the host computer transmit by the broadcasting signal from the broadcasting station;
(2) Separating means, couple to the input means, for separating digital data signal of newspaper from the broadcasting signal;
20 (3) Memory means, coupled to the separating means, for storing the digital data signal of newspaper;
(4) Signal processing means, coupled to the memory means, for processing the digital data signal stored in the memory means to viewable data for TV monitor;
25 (5) Searching means, coupled to the central processing means, for searching the newspaper articles on TV monitor for reading, enlargement, erasing or storing;
(6) Address designating means for designating at least one or more of individual address and group address;
(7) Connecting means for connecting printing device to print certain article;
30 (8) Central process unit for controlling the above means.

39: An apparatus of claim38, further comprising 2nd memory means for storing digital data of certain articles to reserve by subject.

35 **40:** The method of e-newspaper delivery utilizing network TV, satellite TV or cable

TV system comprising the step of,

- (1) Transmitting digital data signal of newspaper to the host computer of the broadcasting station from newspaper company;
- (2) Converting the digital data of the newspaper to the broadcasting signal and transmitting the broadcasting signal with subscriber's address signal by the broadcasting station;
- (3) Receiving the digital data of newspaper from the broadcasting station and storing in the memory means of subscriber's terminal by address;
- (4) Reading the newspaper by subscriber with TV monitor after processing digital data from the memory means to operable signal for TV, and enlarging the article;
- (5) Storing or printing the data of the certain article to reserve by subscribers.

41: The method of article 40, further comprising the step of,

- (1) Designating group address according to the newspaper to each subscriber's terminal, by the instruction signal transmitted with individual address from the host computer;
- (2) Transmitting the broadcasting signal with compressed digital data of newspaper with group address so that the data of newspaper delivered at the same time with a single group address.

42: The method of bi-directional communication by the relay of the broadcasting station of network TV or satellite TV comprising the step of,

- (1) Designating address code of subscribers to message data and sending message to the host computer of the broadcasting station from the sender;
- (2) Converting the message data to the broadcasting signal and transmitting the broadcasting signal with receiver's address code to the receiver's terminal;
- (3) Separating message data at subscriber's terminal from the broadcasting signal, which delivered by address code, and storing message data in memory mean of receiver's terminal as well as notifying the arrival of message.

43: The method of bi-directional communication utilizing cable TV network comprising the step of,

- (1) Designating address code of subscribers to send message data with sender's address code to the host computer of the broadcasting station;
- (2) Transmitting message data with address code of receiver to the host computer of

broadcasting station through the communication means of set-top box;

(3) Converting the address data of the receiver to address of set-top box of the receiver;

(4) Receiving message data at subscriber's terminal by down-stream signal of the
5 broadcasting station and notifying the arrival of message.

44: The method of claim43, wherein up-stream signal is out of band and down-stream signal is in-band.

10 **45:** The method of claim43, wherein up-stream signal is out of band and down-stream signal is the broadcasting signal.

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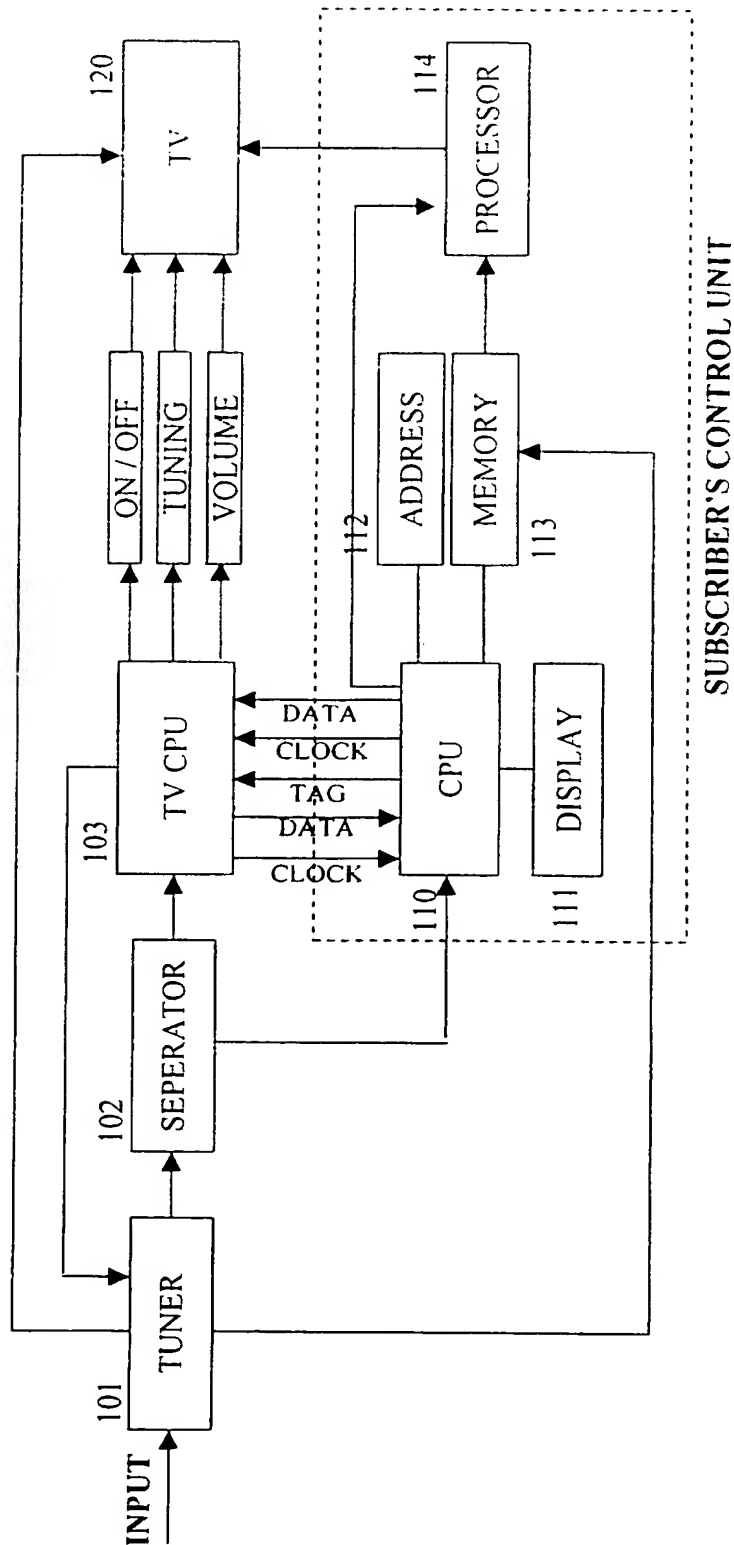


FIG. 1

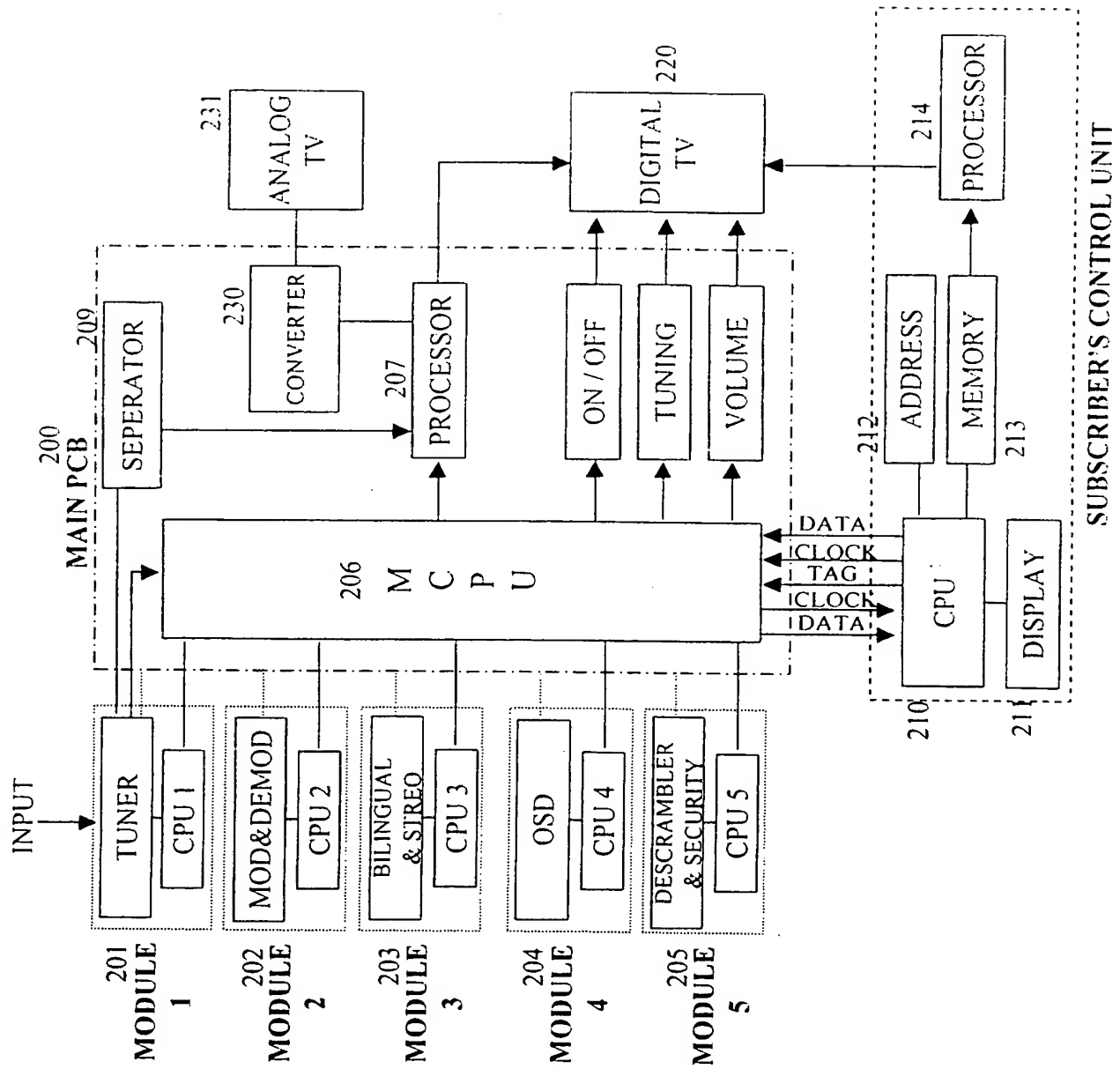


FIG. 2

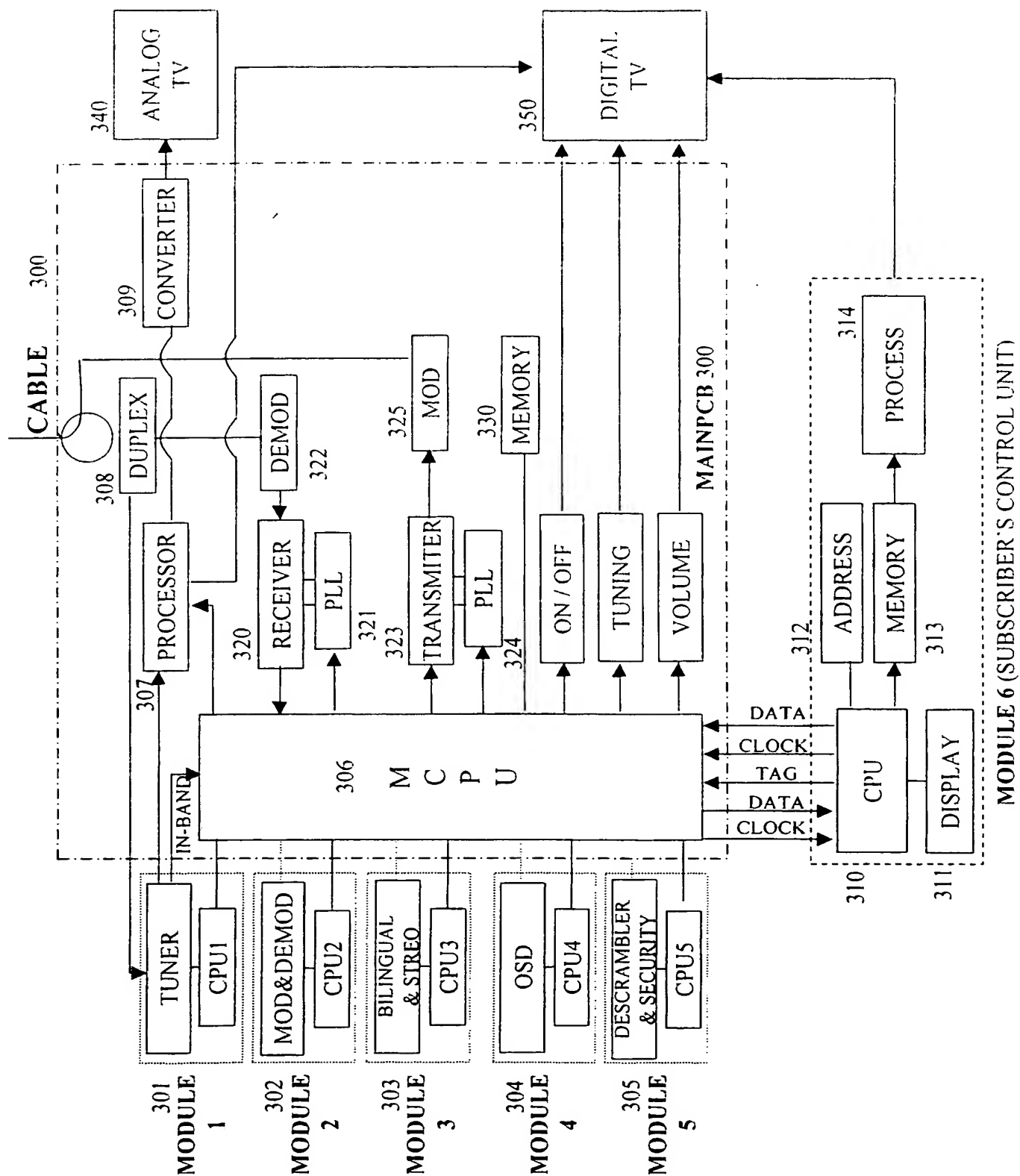


FIG. 3

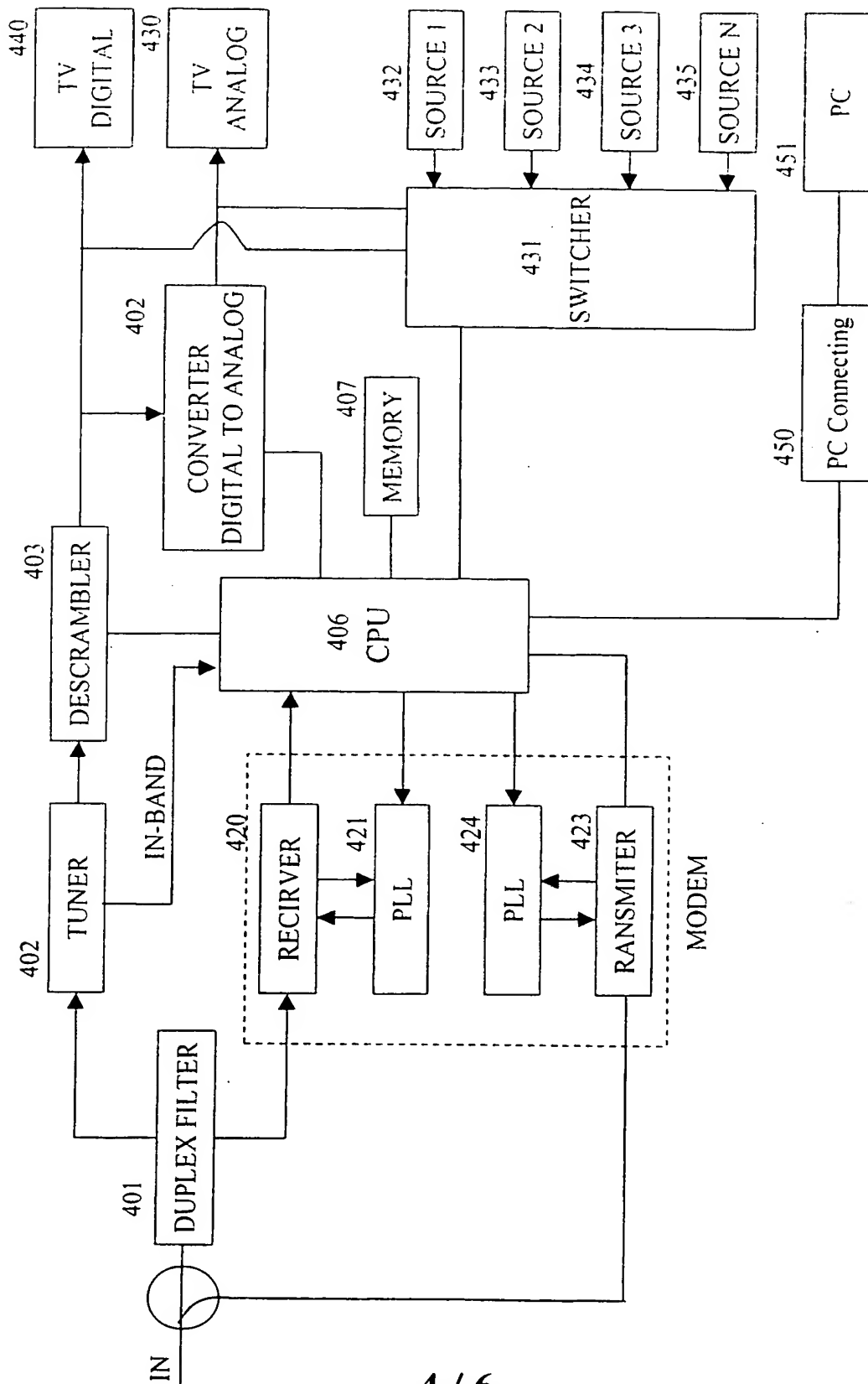


FIG. 4

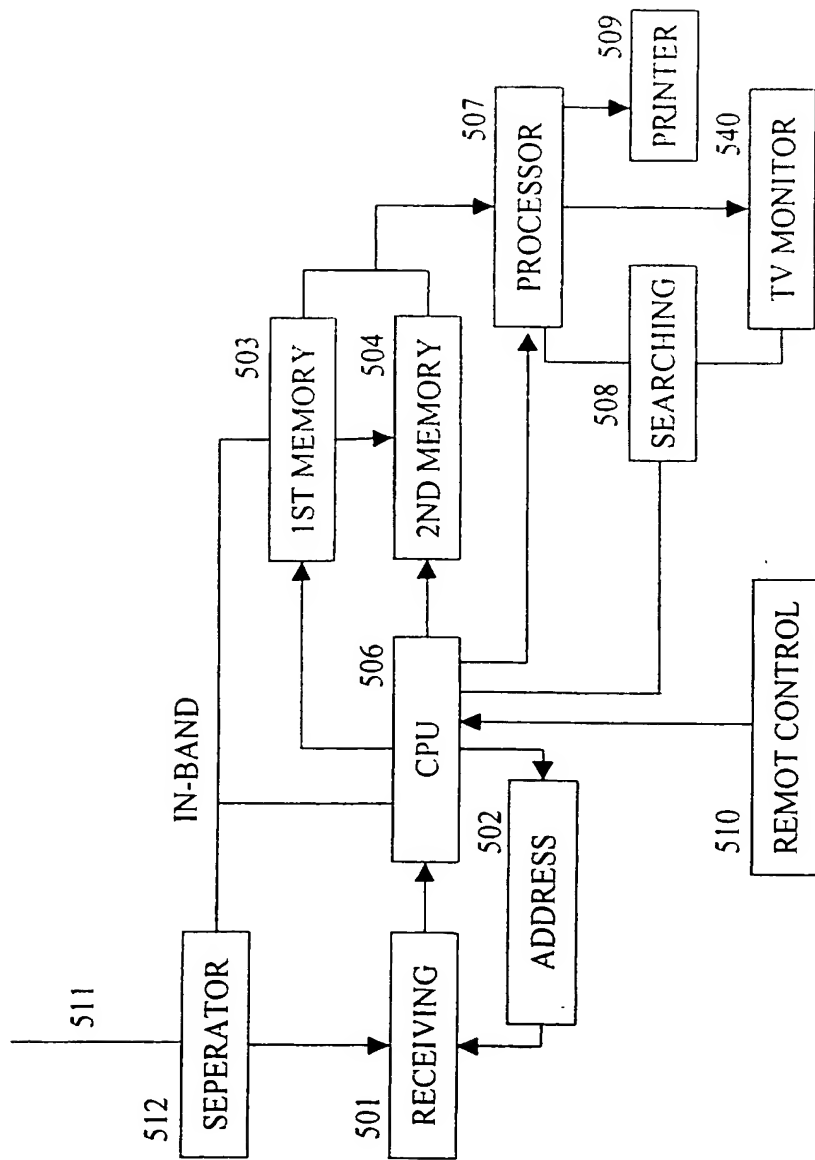


FIG. 5

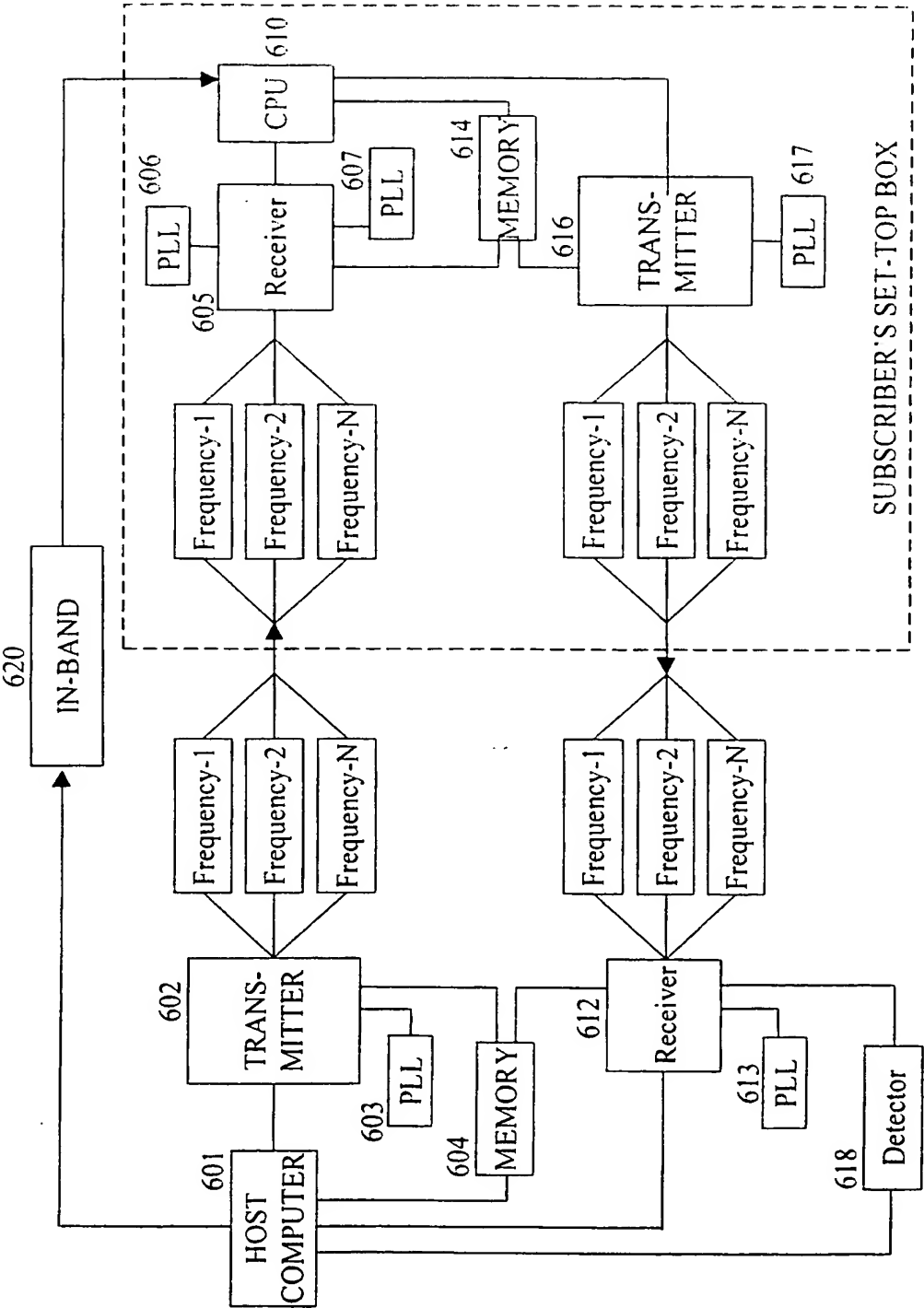


FIG. 6

INTERNATIONAL SEARCH REPORT

international application No
PCT/KR00/01165

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04N 7/167

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 H04N 7/167

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975, Korean Utility models and applications for Utility models since 1975, Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PAJ, INSPECT "interactive television broadcasting system"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
Y	WO 95/28798(Scientific-atlanta inc.) 26 October 1995 see the whole document	1-23, 29, 33-45
Y	jp11-168667(Matsushita electric Co.) see the whole document	1-23, 29, 33-45
Y	KR98-053219(Daewoo electronics Co.) 31 July 1997 see the FIG. 2,3, claim 1	1, 6, 18



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

30 JANUARY 2001 (30.01.2001)

Date of mailing of the international search report

31 JANUARY 2001 (31.01.2001)

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INTERNATIONAL SEARCH REPORT

International application No
PCT/KR00/01165

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely.
2. ☒ Claims Nos.: 25, 30, 31
because they relate to part of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

The claims are indefinite scope to make meaningful search possible.
3. ☒ Claims Nos.: 24
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Search Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be established without effort justifying an additional fee, this Authority did not invite payment of any addition fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/KR00/01165

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 95/28798	26.10.1995	KR1997702664 A	13. 5.1997
JP11-168667	22. 6.1999	KR1999062819 A	26. 7.1999
KR1997057442 A	31. 7.1997	NONE	

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